
Clock Controller Installation

There are three steps to installing a Clock Controller:

- 1 Determining the location of the Clock Controller card (shelf and slot).
- 2 Setting the switches on the card.
- 3 Inserting the card and connecting the cables. This step may also entail removing an old card.

This chapter describes the details of this process.

CAUTION

Do not deviate from the procedures described in this section, as deviation stops call processing.

Determining slots and shelves

The Clock Controller card installation site varies from system to system.

Table 20 shows the systems, the shelves used, and the available slot or slots.

Table 20
Clock Controller shelves and slots

System	Shelf	Slot(s)
ST, STE	CE	5-12
RT	network	13
NT, 51/ 51C	QSD39 network (LH)	13
	QSD40 network (RH)	2
XN	QSD17 CPU	14
XT	QSD62	15
21, 21E	NT8D11 CE	4-7
61/ 61C	NT6D39 CPU/NET	9
71	NT8D34 CE CPU/MEM	14
81/ 81C	CORE/NET	9

Before installing a Clock Controller, set the switches as shown in **Tables 21**, **22**, **23**, and **24**. The first three tables display the settings for different vintages of the QPC471. **Table 24** shows the settings for the QPC775.

Table 21
Clock Controller switch settings for QPC471 vintage A

System	Switch	Setting
NT, RT	SW2	ON
XN, XT	SW2	OFF
Vintage A applies only to these systems		

Table 22
Clock Controller switch settings for QPC471 vintages B through G

System	Switch	Setting
ST, STE, 21, 21A, 21E	SW1	ON
	SW2	OFF
	Jumper Plug J1	TP8-9
	Jumper Plug J2	TP11-TP12
NT, RT, 51, 61	SW1	ON
	SW2	OFF
	Jumper Plug J1	TP8-TP9
	Jumper Plug J2	TP11-TP12
XN, XT, 71	SW1	OFF
	SW2	OFF
	Jumper Plug J1	TP8-TP9
	Jumper Plug J2	TP11-TP12

Table 23
Clock Controller switch settings for QPC471 vintage H

System	SW1	SW2	SW4
ST, STE, 21A, 21, 21E	on on on on	off off off off	off off off off
SN	on on on on	on on on on	off off off off
RT, NT, 51/51C, 61/61C	on on on on	off off off off	off on * *
XN, XT, 71, 81/81C	off off off off	off off off off	off on * *
Cable length between the J3 faceplate connectors:			
0-4.3 m (0-14 ft.)			off off
4.6-6.1m (15-50 ft.)			off on
6.4-10.1m (21-33 ft.)			on off
10.4-15.2 m (34-50 ft.)			on on
• If there is only one Clock Controller card in the system, set to OFF. If there are two Clock Controller cards, set to match the cable length between the J3 faceplate connectors. Determine the total cable length (no single cable can exceed 25 ft.) between the J3 connectors. Both cards must have the same setting.			

Table 24
Clock Controller switch settings for QPC775

System	SW2	SW3	SW4
NT, RT, ST, STE, 21, 21A, 21E, 51/51C, 61/61C	ON	OFF	ON
SN	ON	ON	OFF
XN, XT, 71, 81/81C	OFF	OFF	ON

Replacing a Clock Controller

Step 2 in **Procedure 12** explains how to replace a card.

Do not disable an active clock or a clock associated with an active CPU.

Installing a Clock Controller

Be sure to inspect the Clock Controller card before installing it. Refer to the tables at the beginning of this chapter for shelf, slot, and switch setting information. Remember not to use both the QPC471 and the QPC775 on a single system. QPC471 vintage H cards cannot be mixed with cards of an earlier vintage.

Starting the Clock Controller

The Clock Controller, when first enabled, is in free run mode. It stays in this mode for several minutes before being switched to tracking mode. Manual mode setting is possible via LD 60.

For the earlier QPC471 vintages, up to 20 minutes may pass before the clock actually locks and tracks. The QPC471 vintage G and H cards begin tracking within 5 minutes.

Clock Controller commands

During the installation procedure you will use some of the Clock Controller commands available in LD 60. In the list of commands below, “x” refers to the Clock Controller number: 0 for the card associated with CPU 0, 1 for the card associated with CPU 1.

- DIS CC x: Disable system Clock Controller x
- DCK loop: Disable clock for specified loop
- DSYL loop: Disable yellow alarm processing for loop
- ENCK loop: Enable clock for specified loop
- ENL CC x: Enable system Clock Controller x

- ENYL loop: Enable yellow alarm processing for loop
- EREF: Enable automatic switchover of system clocks
- SSCK x: Obtain status of system clock x
- SWCK: Switch system clock between active and standby
- TRCK aaa: Set Clock Controller track where aaa can be PCK (the primary DTI/PRI reference), SCLK (the secondary DTI/PRI reference), or FRUN (free running)

Procedure 12

Installing the Clock Controller in the ST, STE, 21, 21E, RT, 51/ 51C, and NT half group

Note: Refer to the tables in this section to be sure you are using the correct vintage.

- 1** Set the ENL/DIS toggle switch to DIS (disable) on the new circuit card.
- 2** If replacing an existing card, do the following:
 - Perform a status check on the clock with the SSCK command in LD 60. The new controller should have the same status.
 - Disable the old card using LD 60.

Note: ERR20 messages may be generated. These can usually be ignored. However, excessive clock switching should be avoided, especially when counters are near the maintenance or out-of-service thresholds. Excessive switching could generate threshold-exceeded messages or cause the PRI to be automatically disabled. Check the counters in LD 60. If necessary, reset the counters using the RCNT command.

- Set the old card's faceplate ENL/DIS switch to DIS.
- Disconnect cables from the old Clock Controller card and remove the card from the shelf.

Note: The Clock Controller status display in this mode indicates NO UART (no universal async receiver transmitter). Do not perform a clock status check when receiving this code.

- 3** Install the new Clock Controller in the selected slot.
- 4** Connect the cables to the new card.
 - Connect the primary reference to J2.
 - If applicable, connect the secondary reference to J1.
- 5** Set the faceplate ENL/DIS switch to ENL (enable).
- 6** Enable the Clock Controller by entering ENL CCx in LD 60.
- 7** Set the error detection thresholds and clock synchronization control in LD 73. (Optional if replacing card; required with new installation.)
- 8** To track on a primary or secondary reference clock, use LD 60. Use the following command:
 - TRCK PCK (for primary)
 - SCLK (for secondary)
 - FRUN (for free-run)
- 9** Issue the SSCK command to check controller status.

Installing the Clock Controller in a single group

Procedure 13

Installing the Clock Controller in the NT, 61/ 61C

Note: Refer to the tables in this section to be sure you are using the correct vintage.

Procedure 14

- 1 Set faceplate ENL/DIS switch to DIS (disable) on the new circuit card.
- 2 If replacing an existing card, do the following:
 - Perform a status check on the clock with the SSCK command. The new card should have the same status.
 - Disable the old card using LD 60. (Only a card in standby state associated with a standby CPU can be disabled using software.)

Note: ERR20 messages may be generated. These can usually be ignored. However, excessive clock switching should be avoided, especially when counters are near the maintenance or out-of-service thresholds. Excessive switching could generate threshold-exceeded messages or cause the PRI to be automatically disabled. Check the counters in LD 60. If necessary, reset the counters using the RCNT command.

- Set the old card's faceplate ENL/DIS switch to DIS.
- Disconnect the cables from the old Clock Controller card and remove the card from the shelf.

Note: The Clock Controller status display in this mode indicates NO UART (no universal async receiver transmitter). Do not perform a clock status check when receiving this code.

- 3 If the 3PE switches have not been modified to recognize the Clock Controller card, adjust them as follows:
 - QSD39 (left-hand side) SW1 OFF (Option 61 shelf 0)
 SW2 ON
 SW4 OFF
 - QSD40 (right-hand side) SW1 OFF (Option 61 shelf 1)
 SW2 ON
 SW4 OFF
 SW8 OFF

- 4** Set faceplate ENL/DIS switch to DIS.
- 5** Install Clock Controller in the selected slot.
- 6** Run and connect cables
 - Connect the primary reference to J2.
 - If available, connect the secondary reference to J1.
 - Connect the cable between the two clocks to J3 on each controller card.
- 7** Set the faceplate ENL/DIS switch to ENL.
- 8** Enable the Clock Controller by entering ENL CC x in LD 60.
- 9** Set the error detection thresholds and clock synchronization controls in LD 73. (Optional with card replacement; required with new installation.)
- 10** To track on a primary or secondary reference clock, use LD 60. Use the following command:
 - TRCK PCK (for primary)
 - SCLK (for secondary)
 - FRUN (for free-run)
- 11** Issue the status check command, SSCK.
- 12** (Optional) Activate the new Clock Controller with the LD 60 SWCK command.
- 13** Repeat, if necessary, for the second Clock Controller.

Procedure 15

Installing the Clock Controller in the XN, XT, 71, and 81/ 81C

Note: Refer to the tables in this section to be sure you are using the correct vintage.

- 1** Set faceplate ENL/DIS switch to DIS on new Clock Controller card.
- 2** If replacing an existing Clock Controller card, do the following:
 - Disable only a card in standby state that is not active and is associated with the standby CPU. Disable the card using the DIS CC X command in LD 60.

Note: ERR 020 messages may be generated—ignore them. To avoid exceeding maintenance or out-of-service thresholds, reset the error counters (LCNT) for PRIs providing a reference clock for the Clock Controller. Reset the counters using the RCNT command in LD 60.

 - Set the old card's faceplate ENL/DIS switch to DIS.
 - Disconnect the cables from the old Clock Controller card and remove it from the shelf.
- 3** Install the new Clock Controller in the selected slot.
- 4** Run and connect the cables
 - Connect the primary reference to J2.
 - If available, connect the secondary reference to J1.
 - Connect the cable from J3 on each controller card to the junctor group connector, QPC417.
- 5** Set the faceplate ENL/DIS switch to ENL.

- 6** Execute the ENL CC X command in LD 60. The faceplate LED should go to the OFF state.
- 7** Enable the Clock Controller by entering ENL CC x in LD 60.
- 8** Set the error detection thresholds and clock synchronization controls in LD 73. (Optional if replacing card; required with new installation.)
- 9** To track on a primary or secondary reference clock, use LD 60. The command follows:
TRCK PCK (for primary)
SCLK (for secondary)
FRUN (for free-run)
- 10** Issue the status check command, SSCK.
- 11** (Optional) Activate the newly installed Clock Controller with the LD 60 SWCK command.
- 12** Repeat, if necessary, for the second Clock Controller.